

Nine Technologies Complete Verification Tests Successfully

Nine vendor companies—two with multi-parameter water probes and seven with ambient ammonia monitors—have completed verification tests conducted by the Advanced Monitoring Systems (AMS) Center, which is managed by Battelle in partnership with the U.S. EPA's Environmental Technology Verification (ETV) Program.

The nine newly verified technologies bring the AMS Center's technology verification count to 84 and the ETV's total to 286. Photos and descriptions of the seven ambient ammonia monitors and two multi-parameter water probes are provided in this issue. Test results for the nine technologies will be posted on the ETV Web site (<http://www.epa.gov/etv>).

Seven Ambient Ammonia Monitors

The verification test for the ambient ammonia monitors was conducted at two locations in Iowa—a swine finishing farm near Ames and a cattle feed lot in Carroll. Staff members from the U.S. Department of Agriculture's Agricultural Research Service in Ames collaborated in this test of seven technologies that can measure gaseous ammonia in ambient air at animal feeding operations (AFO).

Ammonia (NH_3) is the most abundant gas-phase base that is present in the atmosphere. NH_3 contributes significantly to atmospheric acid-base chemistry, and adds to nitrogen deposition and the formation of secondary fine particles, a major component of $\text{PM}_{2.5}$. More than 70% of ammonia emissions in the U.S. are estimated to originate from AFOs. Ammonia itself is not currently regulated by the U.S. EPA's Clean Air Act, although ammonia's potential contribution to $\text{PM}_{2.5}$,

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Ambient Ammonia Monitors



Technology: QC-TILDAS
Company: Aerodyne Research, Inc.
Address: 45 Manning Rd.
Billerica, MA 01821
Phone: 978-663-9500
Fax: 978-663-4918
Web Site: www.aerodyne.com/
E-Mail: shorter@aerodyne.com



Technology: OPAG 22
Company: Bruker Daltonics, Inc.
Address: 40 Manning Rd.
Billerica, MA 01821
Phone: 978-663-3660
Fax: 978-667-5993
Web Site: www.bdal.com
E-Mail: fnt@bdal.com



Technology: TGA310 Ammonia Analyzer
Company: Omnisens SA
Address: Parc Scientifique d'Ecublens
1015 Lausanne, Switzerland
Phone: +41 216938486
Fax: +41 12742031
Web Site: www.omnisens.ch/
E-Mail: info@omnisens.ch



Technology: Model 17C Ammonia Analyzer
Company: Thermo Electron Corp.
Address: 72 Forge Parkway
Franklin, MA 02038
Phone: 508-553-6850
Fax: 508-520-0430
Web Site: www.thermo.com/
E-Mail: michael.nemerqut@thermo.com



The AMS Center, which is part of the U.S. Environmental Protection Agency's Environmental Technology Verification Program, verifies the performance of technologies that monitor for contaminants and natural species in air, water, and soil. ETV was established to accelerate the implementation of improved environmental technologies through third-party verification testing and reporting of the technologies' performance. The ETV process provides purchasers and permittees with an independent assessment of the technology they are buying or permitting and facilitates multi-state acceptance. For further information, contact Helen Latham at Battelle, 505 King Ave., Columbus, Ohio 43201-2693; Phone 614-424-4062; Fax 614-424-5601; E-mail lathamh@battelle.org.

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which is regulated by the act, may be important in agricultural areas.

The emission rates of NH_3 from AFOs have not been fully characterized. What is needed are methods to accurately quantify the contribution of ammonia emissions from AFOs to atmospheric ammonia concentrations and the potential production of $\text{PM}_{2.5}$.

The goal of the verification test for ambient ammonia monitors was to evaluate the performance of such monitors under normal operating conditions and to test each instrument's performance in measuring gaseous NH_3 in ambient air at two animal feeding operations. Also evaluated were relative accuracy, precision, response time, calibration and zero drift, interference effects, comparability to a reference method, ease of use, and data completeness.

Two Multi-Parameter Water Probes

The second round of verification tests for the multi-parameter water probes was conducted in collaboration with the National Oceanic and Atmospheric Administration's (NOAA) Center for Coastal Environmental Health and Biomolecular Research. One of the participating companies, YSI Inc., had submitted its instrument (model 6600, Extended Deployment System) for testing in the first round, then made changes in the instrument prior to this test.

The objective of the test was to evaluate the performance capabilities of the probes under both realistic operating conditions, such as water depth and duration of the unattended operations, and in a laboratory or other controlled setting. Instruments were deployed in the laboratory and in freshwater and salt water for up to 30 days in or near the Charleston Harbor from October 2003 through January 2004. The instruments were deployed at depths of one to 10 feet, varying according to the tide. Reference samples were collected throughout the test for comparison to the technology-measured values.

The accuracy, precision, linearity, and inter-unit reproducibility of each probe were evaluated for a variety of water quality parameters. AANDERAA's probe was evaluated for turbidity, temperature, and dissolved oxygen, while YSI Inc.'s was tested for turbidity, chlorophyll, conductivity, temperature, dissolved oxygen, and pH.



Technology: IonPro-IMS Ammonia Analyzer
Company: Molecular Analytics, Division of Particle Measuring Systems
Address: 8475 Airport Blvd. Boulder, Colorado 80301
Phone: 800-238-1801
Fax: 303-546-7331
Web Site: www.ionpro.com
E-Mail: kwebber@pmeasuring.com



Technology: Nitrolux™ 1000 Ammonia Analyzer
Company: Pranalytica, Inc.
Address: 1101 Colorado Ave. Santa Monica, CA 90401
Phone: 310-458-3345
Fax: 310-458-0171
Web Site: www.pranalytica.com/
E-Mail: patel@pranalytica.com



Technology: AiRRmonia
Company: Mechatronics Instruments BV
Address: P.O. Box 225 1620 AE Hoorn The Netherlands
Phone: +31 229 291129
Fax: +31 229 241534
Web Site: www.mechatronics.nl
E-Mail: rob@mechatronics.nl

Multi-Parameter Water Probes



Technology: RCM Mk II with Optode 3830
Company: AANDERAA Instruments, Inc.
Address: Nesttunbrekken 97 5221 Nesttun, Norway
Phone: +47 55 109900
Fax: +47 55 109910
Web Site: www.aanderaa.com
E-Mail: info@aanderaa.no



Technology: 6600 Extended Deployment System
Company: YSI Inc.
Address: 1725 Brannum Lane Yellow Springs, OH 45387
Phone: 937-767-7241
Fax: 937-767-1058
Web Site: www.ysi.com
E-Mail: environmental@ysi.com